## **AP** Physics 1 Review Questions

## Integrating Content, Inquiry and Reasoning

A spring-loaded launch mechanism is used to propel a box up a frictionless ramp. The box has a mass of 2.20 kg and an initial height of 0 m. The spring constant of the launch mechanism is 1776 N/m.

- 1. The spring is compressed by 0.20 m and released. Determine the maximum height of the box.
- 2. The box then slides back down the ramp from its maximum height into the spring. What is the compression distance of the spring? Explain.
- 3. Predict how the following independent changes to the spring-box system would affect the maximum height of the box.
  - a. Doubling the mass of the box.
  - b. Doubling the compression distance of the spring.
  - c. Decreasing the angle of the ramp.
- 4. Assume the spring is now attached to the box and has a mass of 0.150 kg. The spring is compressed by 0.20 m and released. Will the box-spring system travel to the same height found in Question 1? If not, will it go higher or lower? Justify your answer.

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